

Culture Influences Source-memory for Self-referenced Information

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Source Memory Improves in Contexts Consistent with Cultural Values

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Summary

Much of existing memory research has focused on individuals from Western cultures. As our society becomes increasingly multi-cultural, a cross-cultural approach to memory research is critical for generating more generalizable theories of memory. The values an individual endorses can influence the information that they remember, and the values that different cultural groups cultivate lead to substantive differences in the way people understand themselves. For example, East Asian cultures cultivate values of interdependence, while Western cultures cultivate values of independence. In this study, students from East Asian and Western cultures decided whether trait adjectives were self-descriptive. The adjectives were presented in two contexts: a context stressing independence and a context stressing interdependence. It was predicted that source memory would be improved in contexts that emphasize values that are consistent with the cultural values an individual endorses. Americans accurately recalled more words paired with the context stressing independence than words paired with the context stressing interdependence; suggesting that source memory improves when details being recollected are consistent with cultural values. No significant effects were found within the Chinese group.

Keywords: Culture, episodic memory, long-term memory, source memory, self-construal, self, self-reference effects in memory

Chapter 1: Introduction

1.1 Self-referencing and Memory

Well-structured information facilitates memory. One meaningful way to impose structure on information is by making incoming information personally relevant. This memory effect is called the self-referencing effect (Rogers, Kuiper, & Kirker, 1977). In the most common self-referencing experimental design, participants make self-relevance judgments for lists of trait-adjectives such as, “friendly,” or “funny,” and are asked to decide whether the adjective is self-descriptive. Using this paradigm, Symons & Johnson (1997) found that item memory (memory for the trait-adjectives) is strengthened by use of self-referential processing. Recent research has demonstrated that self-referential processing produces a similar benefit for recollection of contextual details associated with the item (Leshikar & Duarte, 2011). Memory for contextual details associated with an item is referred to as source memory. Source memory can include remembering information such as list membership, screen location, or temporal order of presentation.

There are a few possible mechanisms that produce the self-referencing effect. One explanation involves the theoretical construct of the self-schema. The self-schema is a highly organized, well elaborated cognitive structure that organizes autobiographical knowledge (Markus, 1977). The values and experiences an individual has influence the structure of the self-schema. People tend to remember information that is cohesive with the values and motivations contained in their self-schema (Conway, 2005).

Memory is influenced by motivations. Anderson & Pichert (1978) manipulated the motivations of the participant through the use of vignettes. Participants were either asked to

imagine themselves as bank robbers or prospective homebuyers. After reading a short story about a house, participants were asked to freely recall information about the house. Participants who were asked to imagine themselves as bank robbers recalled different information than the participants who imagined their selves to be homebuyers. The 'bank robber' participants recalled information such as a door with a broken latch, or expensive appliances. The 'home-buying' participants recalled information such as a leaky roof, or condition of the yard. Half of the participants were asked to "switch" perspectives. For instance, half of the 'bank robber' participants were subsequently asked to imagine their selves to be homebuyers. Following the perspective switch, all participants were asked to recall the information again. Participants who switched perspectives recalled more and different information than participants who did not switch perspectives. This experiment and others like it are examples of concept-driven priming and motivation influencing the details recollected from an encoded event (Anderson & Pichert, 1978; Anderson & Pichert, 1983; Conway & Pleydell-Pearce, 2000).

Memory can also be influenced by experience. Expertise and domain-specific knowledge about a subject makes it easier to remember new information about that subject. For example, Chase and Simon (1973) compared the ability of expert chess players and novice chess players to observe and reproduce arrangements of chess pieces on a chessboard. Expert chess players were better able to reproduce arrangements of chess pieces than novice chess players. Experts in a subject appear to be better able to organize incoming information, resulting in more accurate memory for that information.

1.2 Culture and Memory

Culture can influence the values an individual endorses (Schwartz, 1999). Eastern cultures, such as Chinese culture, cultivate values that stress the importance of social relationships; these are collectivistic values. In contrast, Western cultures (e.g., United States) cultivate values of independence, individuality, and uniqueness; these are individualistic values (Markus & Kitayama, 1991). Beyond geographic location, economic, and political factors, the values a culture instills in an individual will dictate the types of experiences they have. All individuals have information in their self-schema for the “independent” self and for the “social” self. The social self can be thought of as a schema containing information about the self in relation to other people, social roles, and relationships. The independent self can be thought of as a schema containing information about the self that is stable across difference conditions and personality traits. To the extent that culture can differentially influence the frequency and strength of activation for these two structures, culture will also influence their degree of organization and elaboration (Wagar & Cohen, 2003).

Culture can directly influence memory (Wagar & Cohen, 2003). In one experiment, Asian-Canadian and Euro-Canadian participants processed trait-adjectives (e.g., happy, smart, funny) and social-role adjectives (e.g., friend, employee, sister) for either self-relevance or close other-relevance. Reaction times were used as the dependent variable assessing recognition of these adjectives. Standard self-reference effects were found in the Euro-Canadian participants: words processed for self-relevance were recognized more quickly than words processed for close other-relevance. Asian-Canadians were slower to recognize trait-adjectives compared to social-role adjectives when processed for self-relevance, and they were faster to recognize social-role

adjectives that were processed for self-relevance compared to those that were processed for other relevance (Wagar & Cohen, 2003). These results are consistent with the theory that individuals from collectivistic cultural backgrounds possess better elaborated, more salient representations for their “social” self, compared to their “independent” self. These results also provide support for the type of culture x context manipulation used in the current study (discussed in section 1.4). This study also provides empirical evidence for the effect of memory on culture; however, it has some important limitations. First, the study did not situate self-relevance judgments for traits within *specific* contexts or relationships. It is possible that individuals from collectivistic cultural backgrounds, such as China, have a well-elaborated self-schema for certain situations from which they may easily remember trait adjectives. Second, the study did not include an assessment of source memory. The effect of culture on memory may be most pronounced for the specific details of an encoded event. The current project aimed to address both of these limitations.

Recent findings demonstrate robust differences in the way people from different cultures attend to and perceive the world around them. People from Asian cultures attend heavily to contextual information, and people from Western-European cultures tend to parse information in ways that deemphasize contextual information (Masuda & Nisbett, 2001). For example, East Asians and Westerners were asked to rate the emotions expressed by a cartoon child surrounded by a group of other children. If the emotion expressed by surrounding figures was inconsistent with the target figure, East Asian’s ratings of the target’s emotion were influenced in the direction of the emotions being displayed by the surrounding others; this effect was not seen in Western participants. When given a recognition task, the Japanese participants and American

participants were equally accurate in judging whether they had seen the figure in the foreground; however, Japanese participants were much better than the American participants at correctly rejecting unfamiliar faces in the background as being novel (Masuda et al., 2008). This suggests that Japanese individuals may be better source monitors than Americans; however, this effect could be attributed to the cultural values of social relationships and group cohesion. The current study addresses this limitation.

Related findings show that East Asians tend to parse stories (Ross & Wang, 2010; Qi Wang, 2009) and street scenes into fewer segments than Americans (Miyamoto, Nisbett, & Masuda, 2006). The results from these studies seem to imply that the values cultivated in East Asian cultures support attending to contextual details more than the values of Western-European cultures. Although these prior studies of attention did not directly address memory, there is an intimate relationship between what is attended to and what is remembered.

It seems to follow from these prior studies that people from East Asian cultures may be better source-monitors than people from Western-European cultures; however, these prior studies have important limitations. These studies have advanced the understanding of the effect of culture on attention, but have used stimuli that are biased toward the cultural value of social relationships supported by Asian cultures (Masuda et al., 2008), or have used tasks that do not require self-referential processing (Chua, Chen, & Park, 2006). Given these limitations, it is not surprising that the current concordance of results support the idea that Westerners are less likely to attend to and remember contextual details than East Asians. As reviewed in prior sections, values and motivations have a robust impact on what is attended to and remembered. It is possible that Americans are apt source-monitors when information is presented in contexts that

are cohesive with cultural values of independence. The current study aims to address this issue by situating judgments for self-relevance within two contexts: one that is cohesive with values of independence, and one that is cohesive with values of interdependence.

1.3 Neural Basis for Influence of Culture on the Self

There are clear differences in the way that East Asians and Westerners perceive and remember information about the world around them. There is a neural basis for these behavioral differences. The endorsement of individualistic or collectivistic values modulates activity in the medial prefrontal cortex (MPFC) for self-relevance judgments (Chiao et al., 2009a; Ray et al., 2010). When people who endorse collectivistic values process trait adjectives for self-relevance situated within a social context (“Does this word describe you when with you mother?”), they show greater activation in the anterior rostral MPFC compared to when they make general self-relevance judgments (Does this word describe you, in general?”). The reverse occurs for individuals who endorse individualistic values: they show greater activation in the anterior rostral MPFC for general self-relevance judgments compared to the social self-relevance judgments. There was no memory component in this study, but given that the MPFC is thought to be involved in the formation and retrieval of self-knowledge, the authors concluded these neural differences reflected enhanced explicit self-knowledge for general and contextual information in individuals endorsing either individualistic or collectivistic values, respectively (Chiao et. al., 2009a). The current study examines whether these conclusions have consequences for behavior.

These results were replicated using bicultural participants who experienced a situation that either primed individualistic or collectivistic values (Chiao et. al., 2009b). Within the MPFC,

bicultural participants who were primed with collectivistic values showed greater activation for social-contextual self-descriptions, and bicultural participants primed with individualistic values showed greater activation for general self-descriptions. Results from these studies and others that use similar methodologies (Ray et. al., 2010) support the validity of the contextual manipulations used in the present study (discussed in section 1.4); further, the results suggest a neural basis for the effect of culture on memory. Following from these neuroimaging results, we expect to see that Americans will have better source memory for information presented in contexts that are cohesive with the well-elaborated independent self, while Chinese people will have better source memory for information presented in contexts that are cohesive with their well-elaborated social self.

The values that a culture cultivates should facilitate remembrance for information that is cohesive with those values. Information associated with well-elaborated schema is remembered better than information associated with schemas that are not as well elaborated. Situating self-relevance judgments within a context that is consistent with the values an individual endorses is expected to aid retrieval of the traits from memory

1.4 Current Study

The proposed study will address the current gap in research, and will use a self-referencing task to assess source-accuracy for trait-adjectives presented in two contexts: one that stresses values of independence (“When alone...”), and one that stresses values of interdependence (“When with family...”). {NOTE:I added discussions of these studies above. I *hope* that it will address those concerns. Let me know if it is still an issue.} Prior studies have

used similar contextual manipulations and have found significant culture by context interactions (Chiao, et. al, 2009; Ray et. al., 2010; Wagar & Cohen, 2003).

This study included measures of recall and recognition. Recall was measured as number of words recollected. Source-memory was assessed through the recall task. By cueing participant to recall trait-adjectives from their respective list, we measured of source-memory. For example, recalling more words that were in the ‘Alone’ task compared to words that were in the ‘Family’ task indicates source-memory is better in the ‘Alone’ task. Recognition was measured through corrected recognition scores that were calculated by subtracting false alarm rates for novel words from hit rates¹. For the recall measures, we hypothesized that American participants would accurately recall more words paired with the ‘Alone’ context than words paired with the ‘Family’ context. Additionally, we hypothesized that the Chinese participants would accurately recall more words paired with the ‘Family’ context than the ‘Alone’ context. Participants were prompted to recall words from each source (e.g., the family or alone contexts). The order of the prompts was counterbalanced across participants. For the recognition, we hypothesized that American participants would more accurately identify the words presented in the ‘Alone’ context than words presented in the ‘Family’ context. The Chinese participants were expected to more accurately identify which words were presented in the ‘Family’ context than words presented in the ‘Alone’ context. The aim of this research was to identify whether cultural differences in self-schema translate into actual differences in recollected item and source memory.

Culture can be viewed as an adaptive mechanism that creates a cohesive society by providing individuals with a shared set of values and motivations. By emphasizing the value of

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certain types of information over others (e.g., family contexts over individual contexts), culture may make memories for that information more salient and well elaborated; more salient, well elaborated memories may in turn reinforce what an individual considers valuable and important. The overarching goal of cross-cultural studies of cognition is not to generalize the specific findings all culture. Rather, it is to explore the self-sustaining feedback loop that culture and cognition create. This project achieves this goal in part by examining how cultural values influence memory. To answer research questions of this kind, breadth of sampling must be sacrificed because the independent variable manipulations must be made relevant to a specific culture.

It is important to note that the specific cultures that are considered collectivistic may vary in the ways that that collectivism manifests. These differences occur for a variety of reasons. For example, child-rearing practices in Japan involve substantially more physical contact between mother and child than in the United States (Lebra, 1994). Additionally, there is evidence that Korean and Chinese grandparents play a greater role in child rearing than American or Japanese grandparents (Yoon, 2005). These types of differences in the early socialization of a child may profoundly affect the types of relationships the child seeks and values as an adult, and the ways the collectivistic value of group cohesion is manifest (Schmitt et al., 2004). The average Chinese person's schema for family and self may overlap to a greater degree than that of the average Japanese person because of these early differences in socialization.

Previous studies have also approached similar research questions by focusing on the similarities and differences between two cultures (Chiao et al., 2009a; Freeman, Rule, Adams, & Ambady, 2009; Ivcevic et al., 2008; Mano et al., 2011; Masuda, et al., 2008; Wang, 2008). A

meta-analysis by Oyserman, et al. (2002) concluded that the self-construal paradigm proposed by Markus and Kitayama (1991) is among the most common, well-understood way to study cultural differences, and that within the self-construal paradigm, the most consistent cultural differences are seen when comparing Americans to Chinese.

Chapter 2: Methods

2.1 Design

This experiment is composed of two phases: an encoding phase and retrieval phase. A within-subjects design, participants experienced both encoding conditions. During the encoding phase, participants made two types of self-relevance judgments for trait adjectives. To reduce task-switching costs, the encoding phase was blocked such that participants made one type of judgment (i.e., “alone” or “family”) per block. The encoding phase of the experiment consisted of 48 trials. Twenty-four adjectives were paired with the ‘alone’ context (“When alone...”); the remaining 24 words were paired with the ‘family’ context (“When with family...”). The order of presentation for these blocks was randomized across participants. Each encoding trial lasted 5750 ms, with a 250 ms fixation between each trial. For each encoding condition (e.g., ‘alone’ or ‘family’), participants processed the stimuli for self-relevance with the context of each respective condition. Participants were asked to pay attention to the context with which the word was paired, and to decide whether or not the word described them in the given situation. Participants were encouraged to think of examples from their own life that might support their decision.

During the test phase, participants completed a blocked recall task lasting a total of six minutes: participants were given three minutes to recall words paired with the ‘Family’ context, and three minutes to recall words paired with the ‘Alone’ context. The order of the recall blocks was counterbalanced across participants.

Additionally, item recognition memory was assessed through an old/new recognition task. Memory for all 48 items was tested (24 items from each encoding condition) plus an additional 24 novel items. In the retrieval phase, there are a total of 72 retrieval trials: 24 adjectives from

each encoding condition, and 24 novel stimuli. Participants were asked whether the word displayed on the screen was “Old” or “New”. The retrieval question was presented for 3000 ms, with a 250 ms fixation between each question. There was no explicit source-memory component in the recognition task. Participants were simply asked to identify whether or not they had seen the word before. The number of trials is similar to the number used in prior studies, with similar methodologies (Chiao et al., 2009; Leshikar & Duarte, 2011; Symons & Johnson, 1997). Figure 1 shows examples of what these trials look like on screen (see Appendix).

2.2 Participants

A total of 41 participants, twelve Chinese international students ($M_{age} = 25.92$; 6 females) and 29 American students ($M_{age} = 20.76$; 13 females) were recruited for this study. The number of American participants recruited for this study is consistent with prior studies using a self-referencing design that have found significant culture by context interactions (Chiao et al., 2009; Wagar & Cohen, 2003). However, fewer Chinese students were recruited than originally planned. Participants were recruited from local universities. American students were Georgia Tech undergraduates, and Chinese students were recruited from both Georgia Tech and Georgia State University. Independent samples t-tests revealed small but statistically significant differences in age ($M_{Americans} = 20.76$, $SD_{Americans} = 1.60$; $M_{Chinese} = 25.92$ $SD_{Chinese} = 3.37$), $t(39) = 6.699$, $p < .001$, and years of education ($M_{Americans} = 15.28$, $SD_{Americans} = 1.31$; $M_{Chinese} = 17.83$ $SD_{Chinese} = 1.11$), $t(39) = 5.911$, $p < .001$, between groups.

Stimuli and instructions were presented in the native language of the respective cultures being studied. Therefore, Chinese participants were required to be fluent in Mandarin, and American participants were required to be fluent in English. Health questionnaires and consent

forms were presented in English.

In order to ensure that observed differences were related to real differences in endorsement of cultural values, participants were given the Singelis Self-Construal Scale, a commonly used measure of self-construal. In order to further quantify the degree of acculturation that occurred in the Chinese students, a condensed version of the Suinn-Lew Asian Acculturation Scale (SL-ASIA) was administered.

Participants were recruited from psychology courses, campus organizations and events. Participants were given the option of being compensated \$10 per hour of participation or with 1 Experimetrix credit per hour of participation.

2.3 Materials

A total of 72 trait-adjectives (i.e., funny, intelligent, serious) and two contextual phrases were used (“When alone, I am...” and “When with family, I am...”) for the self-referencing task. Within the experiment, each self-referencing prompt was referred to as the “alone task,” and the “family task,” respectively. Instructions and trait-adjective stimuli were presented in the participant’s native language, on a computer screen. The lists of stimuli were adapted from standard lists of trait adjectives for Mandarin and English (Anderson, 1968; Yang, 1971). See appendix for lists of words used.

For each language, two lists of 24 words were generated. Each list of words was paired with one of the self-referencing prompts. The pairing of the word list with a context was counter-balanced across participants to control for the possibility that there was a unique, confounding effect of the list of words on the task. The lists of trait-adjectives were equated for valence and frequency.

Within a given culture, significant individual differences exist in terms of endorsement of cultural values. The goal of this study is to determine whether the culturally mediated values an individual endorses affect their memory for self-relevant information. Further, people are highly adaptable to new cultures and environments. An extensive amount of research has observed that the immediate cultural environment influences the values an individual endorses. The SL-ASIA (Suinn, 1992) and Singelis Self-construal Scale (SCS) (Singelis, 1994; Singelis & Brown, 1995) were used to assess endorsement of cultural values. The Singelis Self-construal Scale consists of two orthogonal subscales that measure individualistic and collectivistic self-construal. Each scale consists of fifteen items, with a 7 point Likert scale running from 1 (strongly disagree) to 7 (strongly agree). On the basis of prior literature, Americans were expected to score higher on individualism than the Chinese students, and Chinese students were expected to score higher on collectivism than the American students.

Both the study phase and the test phase of the experiment were performed on a computer. The study and recognition portions were programmed using Eprime 2.0. The recall portion was completed using Microsoft Word 2007.

2.4 Procedure

All participants completed the Singelis Self-construal Scale in their native language as a measure of endorsement of cultural values. Additionally, Chinese participants completed the Suinn-Lew Asian Acculturation Scale, a measure of cultural identification. Participants then completed a brief training version of the encoding phase of the experiment in which they interacted with the researcher and verbally answered on-screen questions. If necessary, participants could complete additional training trials until they understood the task. All

participants reported understanding the task. Following the practice session participants completed the encoding phase of the experiment. Following encoding, participants completed a series of neuropsychological tests for ten minutes to serve as a delay between encoding the recollection and recognition portion of the experiment.

The battery consisted of portions of the Memory Assessment Scale (Williams, 1991). The series of tests assessed working and long-term memory, executive function, and visuospatial abilities. Tests included: Trail Making Tests A and B, immediate visual recognition, visual reproduction, digit span forward and backwards, and delayed visual recognition. Following this ten-minute delay, participants completed the recall portion of the retrieval phase. Participants were told to type as many words as they could remember from one of the blocks of words within three minutes. This was repeated for the other block of words. The order was counterbalanced across participants. After the cued recall, participants completed a recognition task in which they viewed 72 trait adjectives: 48 they had seen before, and 24 new words. The order of the words was pseudorandom, such that no more than 3 words from a given block would be displayed in a row. Participants judged whether they had seen the word before or not by responding “old” if they had seen the word before or “new” if they had not seen the word before. The recognition task was a test of item memory, there was no explicit test of source memory in the recognition task (see Appendix, Figure 1 for examples).

Chapter 3: Results

3.1 Between Groups Comparisons

Endorsement of individualistic/collectivistic values was calculated from the SCS. In order to assess the level of collectivism or individualism endorsed by each group of participants, a repeated-measures analysis of variance (ANOVA) was run. Expected differences in individualism and collectivism as assessed by the SCS were not observed. There was no main effect of SCS, $F(1, 39) = 1.37, p = .25, \eta_p^2 = .034$, and no significant culture by SCS interaction, $F(1, 39) = 0.57, p = .456, \eta_p^2 = .014$. Descriptive statistics are reported in Table 1.

Table 1
Singelis Self-construal scale scores for each group

Culture	Independent SCS	Interdependent SCS
European-Americans		
<i>M</i>	4.68	4.76
<i>SD</i>	0.73	.66
Native Chinese		
<i>M</i>	4.33	4.69
<i>SD</i>	0.75	.64

Note. No statistically significant differences in self-construal score were found between or within groups.

During encoding, participants judged trait adjectives for self-descriptiveness (“Agree” or “Disagree”) in two contexts. A 2 X 2 ANOVA (Culture by Agreement) was conducted. Between groups, no differences in agreement with the lists of words were observed. There was no main effect of culture on agreement with encoded words, $F(1, 37) = .063, p = .803, \eta_p^2 = .002$, and there was no interaction, $F(1, 37) = .182, p = .672, \eta_p^2 = .005$. This rules out the possibility that differences in agreement with the words influenced differences in recollection or recognition.

3.2 Recall

Recall performance was assessed by counting the number of words correctly recollected from each encoding condition. Table 2 displays means and standard deviations for number of misses, intrusions (words produced during a recall block that were not seen in the corresponding study block), and words correctly recollected across groups and conditions. A 2 x 2 repeated-measures ANOVA including factors of Condition (self, family) and Culture (American, Chinese) revealed no main effect of Condition, $F(1, 39) = .415, p = .523, \eta_p^2 = .011$, but showed a trend for an interaction $F(1, 39) = 3.11, p = .086, \eta_p^2 = .074$ as well as a main effect of Culture $F(1, 39) = 17.3, p < .001, \eta_p^2 = .758$. A follow-up paired samples t-tests was run for each cultural group separately to determine the source of the interaction. The paired samples t-tests showed that American students recollected significantly more words that were paired with the alone ($M = 4.03, SD = 2.06$) condition than words paired with the family ($M = 3.14, SD = 1.77$) condition, $t(28) = 2.15, p < .05$. Although numerically, Chinese students recollected more words paired with the family ($M = 1.83, SD = 1.46$) condition than the alone ($M = 1.42, SD = .90$) condition; the difference was not significant, $t(11) = 0.73, p > .05$.

Between-groups comparisons show that there is a significant main effect of group on words recalled. A repeated measure ANOVA shows that Chinese participants also had significantly more intrusions across conditions, $F(1, 39) = 30.7, p < .001, \eta_p^2 = .44$. Descriptive statistics are reported in Table 2.

3.3 Recognition

To assess recognition performance, corrected recognition scores were calculated by subtracting false alarm rates for novel words from hit rates². A 2 x 2 repeated-measures ANOVA (Culture X Context) revealed no main effect of Context on item recognition, $F(1, 39) = .219$, $p = .642$, $\eta_p^2 = .006$, and showed no interaction between culture and Context, $F(1, 39) = .040$, $p = .843$, $\eta_p^2 = .001$.

Table 2
Descriptive Statistics for Recall Phase

	Chinese	Americans
Self Hits		
<i>M</i>	1.42	4.03
<i>SD</i>	0.90	2.06
Self Intrusions		
<i>M</i>	6.85	2.83
<i>SD</i>	2.54	1.71
Family Hits		
<i>M</i>	1.83	3.14
<i>SD</i>	1.47	1.76
Family Intrusions		
<i>M</i>	6.25	2.97
<i>SD</i>	2.99	1.82

Table 3
Mean and Standard Deviation Corrected Recognition Scores

	Chinese	Americans
Self Condition		
<i>M</i>	.55	.62
<i>SD</i>	.16	.17
Family Condition		
<i>M</i>	.54	.60
<i>SD</i>	.14	.14

Note. Between and within group differences in corrected recognition scores were not statistically significant.

Chapter 4: Discussion

The current study investigated cross-cultural differences in source memory for self-referenced trait-adjectives. Source memory can include remembering information such as list membership, screen location, or temporal order of presentation. The measure of source memory in this study was the number of trait adjectives recalled from a given list/context. Cueing participants to recall only the items that were within a given context requires the participant to remember the items themselves, and also how they were studied. Conceptualizing the ‘Alone’ task and ‘Family’ task as items, and the trait-adjectives as source-details associated with those items is an alternative way of viewing this measure of source memory. One of the contexts was supportive of collectivistic values of social relationships, group cohesiveness, and interdependence. The other context was supportive of individualistic values of autonomy, uniqueness, and independence. For Americans, it is clear that recollection was facilitated by contexts that are cohesive with values of independence.

Although not statistically significant, the contextual differences in recollection were Chinese participants were in the direction predicted. This is likely due to the small dataset for this group that exists, at present. Furthermore, the Chinese participants and the American participants were predominately drawn from different universities. It is possible that the student populations at each university may covary in ways that introduced sources of error into the dataset. Although the differences are not statistically significant, there is an overall numerical difference in the corrected recognition scores between groups. The American participants have higher corrected recognition scores than the Chinese participants. This supports the inference that the two groups of participants may covary in some unaccounted for dimension.

Generally, performance on recognition tasks are thought to be influenced by both recollection and familiarity, while performance on recall tasks is influenced primarily by recollection. The may point to the contribution of familiarity to item memory. While Americans did recall significantly more words from the Alone context compared to the Family context, there were no within group differences in recognition for the two contexts. This finding may point to the relative contribution of cultural differences to recollection compared to familiarity. The preliminary results suggest culture contributes most to recollection, rather than familiarity.

The predicted contextual differences in recollection for Chinese participants could be masked by the relatively low recall rates for the Chinese participants. There was a main effect of group on total number of words recalled across conditions showing that, although Chinese participants produced more words at recall than Americans, Chinese participants *correctly* recalled fewer words. Recollection for both groups was near floor in both conditions, so future studies should adjust task difficulty. Task difficulty could be adjusted while answering the same basic research question by including a second study phase, where participants would see the words a second time. Studying the words twice may be sufficient to pull performance away from the floor. A second adjustment to the task difficulty might involve reorganizing the order of the tasks performed in the experiment. In the current study the distracter task was performed after study and before the recall portion of the test phase. A redesign might move the distracter task to be after the recall portion and before the recognition portion of the test phase. Alternatively, the distracter task could be dropped altogether.

Although both groups were near floor for recollection, it remains unclear why the American participants were able to accurately recall more words than the Chinese participants. If

there was a significant main effect of group on *both* recollection and recognition, between group differences in mean age and university selection could be likely contributors to the memory differences observed. However, there were no differences in the corrected recognition scores between groups. The English word lists and the Chinese word lists were equated for valence and frequency, and there were no significant differences in judgment for self-descriptiveness. It is also unclear why Chinese participants produced a large number of intrusions compared to the American participants. A between language comparison of lexical network structure may offer a possible explanation. For example, analyses have been run that compare the lexical networks of English and Spanish. Spanish has a larger proportion of words that are phonologically, morphologically, and semantically related compared to English (Arbesman, Strogatz, & Vitevitch, 2010). It is possible that this overlap facilitates retrieval of words from memory (Vitevitch, 2002). Conversely, the overlap could lead to a greater number of intrusions in a task such as the one used in the current study. Although these findings do not examine the semantic networks of Chinese and English, a greater degree of phonological, morphological, and semantic overlap in Chinese compared to English could explain why the Chinese participants in this study produced significantly more intrusions than the American participants.

The unusual pattern of SCS scores may be another factor that is masking the expected Culture by Context interaction effect on recollection and recognition. Typically, Americans report higher scores on individualism than collectivism, and Chinese people report higher scores on collectivism than individualism (Oyserman et. al, 2002). This pattern was not observed in the current study, and may have contributed to the smaller than expected Culture by Context interaction.

This study contributes to existing literature by showing that recollection can be facilitated by cultural values. The contextual manipulations influenced recollection but not recognition. Americans correctly recalled significantly more words from the alone context than the family context; however no differences in recognition were observed. This points to differences in the role of schema in gist-based versus source-based processing, and suggests that culture may mediate these differences. Additional studies are needed to examine this hypothesis. The finding that Americans' recollection is facilitated by contexts that are consistent with cultural values is supported by previous studies showing cultural differences in the degree of elaboration and saliency of the 'independent' self and 'social' self (Wagar & Cohen, 2004). Further, it is supported by findings that show Americans display greater activation in areas of the brain that support source-memory when making judgments consistent with their self-construal (Chiao, 2009).

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Appendix

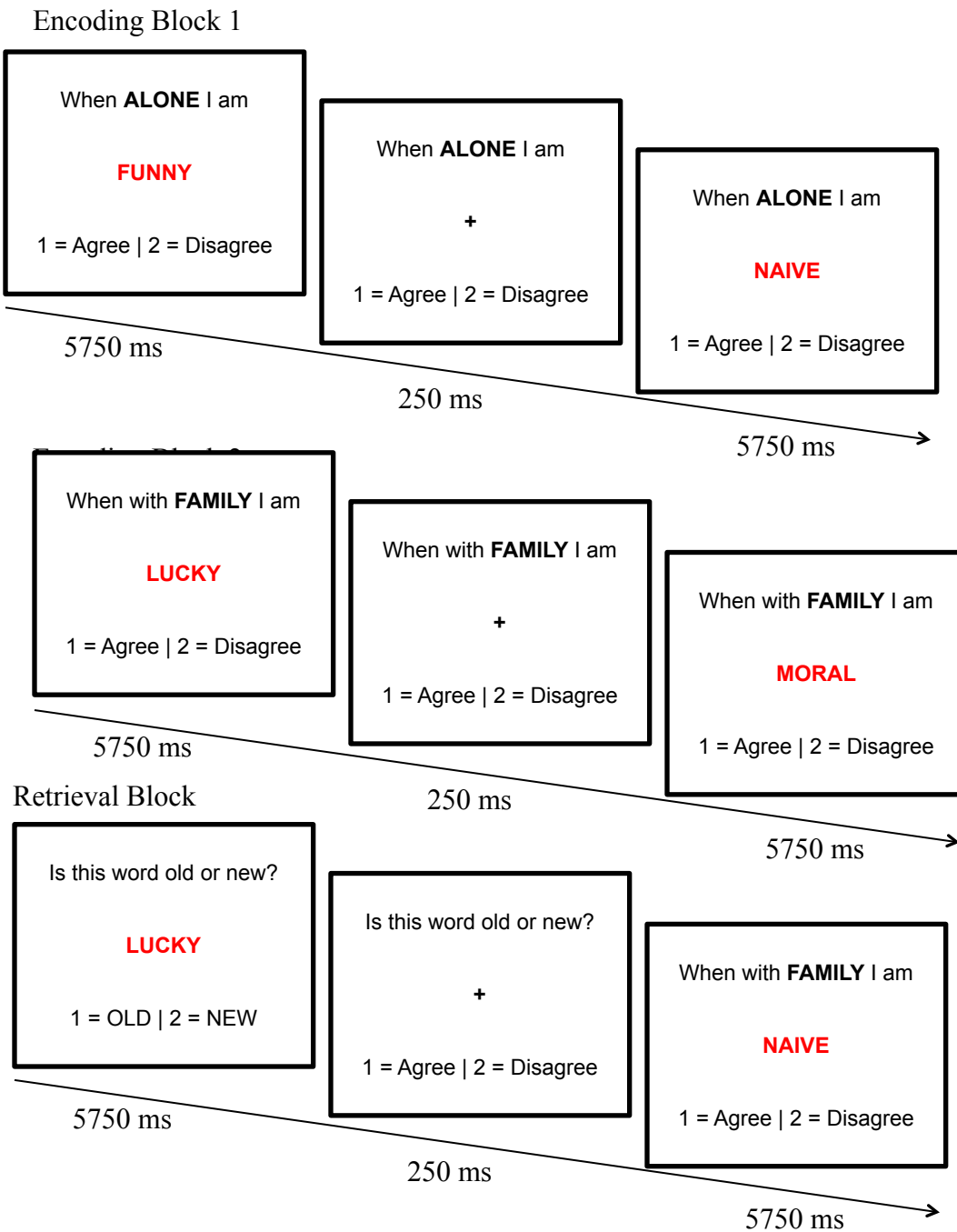


Figure 1. Experimental Design

INSTRUCTIONS

This is a questionnaire that measures a variety of feelings and behaviors in various situations. Listed below are a number of statements. Read each one as if it referred to you. Beside each statement write the number that best matches your agreement or disagreement. Please respond to every statement. Thank you.

1=STRONGLY DISAGREE

4=DON'T AGREE OR

5=AGREE SOMEWHAT

2=DISAGREE

DISAGREE

6=AGREE

3=SOMEWHAT DISAGREE

7=STRONGLY AGREE

- ___ 1. I enjoy being unique and different from others in many respects.
- ___ 2. I can talk openly with a person who I meet for the first time, even when this person is much older than I am.
- ___ 3. Even when I strongly disagree with group members, I avoid an argument.
- ___ 4. I have respect for the authority figures with whom I interact.
- ___ 5. I do my own thing, regardless of what others think.
- ___ 6. I respect people who are modest about themselves.
- ___ 7. I feel it is important for me to act as an independent person.
- ___ 8. I will sacrifice my self-interest for the benefit of the group I am in.
- ___ 9. I'd rather say "No" directly, than risk being misunderstood.
- ___ 10. Having a lively imagination is important to me.
- ___ 11. I should take into consideration my parents' advice when making education/career plans.
- ___ 12. I feel my fate is intertwined with the fate of those around me.
- ___ 13. I prefer to be direct and forthright when dealing with people I've just met.
- ___ 14. I feel good when I cooperate with others.
- ___ 15. I am comfortable with being singled out for praise or rewards.
- ___ 16. If my brother or sister fails, I feel responsible.
- ___ 17. I often have the feeling that my relationships with others are more important than my own accomplishments.
- ___ 18. Speaking up during a class (or a meeting) is not a problem for me.
- ___ 19. I would offer my seat in a bus to my professor (or my boss).
- ___ 20. I act the same way no matter who I am with.
- ___ 21. My happiness depends on the happiness of those around me.
- ___ 22. I value being in good health above everything.
- ___ 23. I will stay in a group if they need me, even when I am not happy with the group.
- ___ 24. I try to do what is best for me, regardless of how that might affect others.
- ___ 25. Being able to take care of myself is a primary concern for me.
- ___ 26. It is important to me to respect decisions made by the group.
- ___ 27. My personal identity, independent of others, is very important to me.
- ___ 28. It is important for me to maintain harmony within my group.
- ___ 29. I act the same way at home that I do at school (or work).
- ___ 30. I usually go along with what others want to do, even when I would rather do something different.

Self-Constraint Scale (Chinese-Simplified)

- | | | |
|---|---|-------|
| 1 | = | 非常不符合 |
| 2 | = | 不符合 |
| 3 | = | 有点不符合 |
| 4 | = | 不能确定 |
| 5 | = | 有点符合 |
| 6 | = | 符合 |
| 7 | = | 非常符合 |

- ___ 1. 我喜欢标新立异，与众不同。
- ___ 2. 我能和初次见面的人坦诚交谈，即使这个人比我年龄大得多。
- ___ 3. 即使非常不同意团体的意见，我也尽量避免发生争论。
- ___ 4. 我对和我交往的权威人物怀有敬意。
- ___ 5. 不管别人怎么想，我只管我行我素。
- ___ 6. 我尊敬那些谦虚的人。
- ___ 7. 我觉得，做一个独立的人对我是意义重大的。
- ___ 8. 我会为了所在团体的利益而牺牲自己的利益。
- ___ 9. 与其可能被误解，不如直接说“不”。
- ___ 10. 生动的想象力对我来说是重要的。
- ___ 11. 在制订教育/职业计划时，我会考虑我父母的意见。
- ___ 12. 我觉得我的命运和周围人的命运是连在一起的。
- ___ 13. 和刚接触的人交往时，我喜欢采取直接、坦率的方式。
- ___ 14. 与人合作时，我感觉愉快。
- ___ 15. 当被单独提名表扬或奖励时，我觉得舒服自在。
- ___ 16. 如果我的兄弟姐妹失败了，我觉得自己是有责任的。
- ___ 17. 我常常觉得和别人的关系比我自己的成就更重要。
- ___ 18. 在课堂上（或会议上）大声发言对我来说不成问题。
- ___ 19. 在公共汽车上，我会把我的座位让给我的老师（或我的老板）。
- ___ 20. 无论和谁在一起，我的行为举止都一样。
- ___ 21. 我是否快乐要看周围的人是不是快乐。
- ___ 22. 我视良好的健康状况高于一切。
- ___ 23. 我会留在一个需要我的团体里面，即使我在这个团体里并不愉快。
- ___ 24. 我尽量去做对我最有益的事，而不管这会给别人造成什么影响。
- ___ 25. 我最关心的是能把自己照顾好。
- ___ 26. 遵从团体的决定对我是重要的。
- ___ 27. 我看重自己的个人身分，不愿意借别人来抬高自己。
- ___ 28. 维持所在团体的和谐对我是重要的。
- ___ 29. 我在家里和在学校里表现一致。
- ___ 30. 我经常追随别人想做的事，尽管有时我宁愿做一些不同的事情。
- ___ 31. 在和人接触不久就直呼其名（略去姓），我觉得很自然，即使他们比我年龄大得多

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